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HOW ARTIFICIAL INTELLIGENCE IS CONTRIBUTING TO THE CONTROL OF THE COVID-19 PANDEMIC

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ABSTRACT

While most of the world was put on lockdown in 2020, the scientific research community went into overdrive trying to figure out what the COVID-19 virus is, how it spreads, and how to develop a vaccine. The fact that development is being done with the help of technology is a little-known fact. Artificial Intelligence (AI) has been working behind the scenes to help overcome the constraints of human understanding in this vast undertaking since the outset. In this article, I'll give some instances of how this can be done in different ways.

The main driving factor behind AI is known as machine learning. In essence, machine learning takes vast volumes of data (known as Big Data) and learns to recognize patterns in it. This allows it to forecast future outcomes and reveal additional information about the data. For example, it may be able to anticipate the number of males over 60 years old who will die from COVID-19 in a certain country. As the following examples demonstrate, significant volumes of data can be used to attribute a high level of confidence to these forecasts.

KEYWORDS: ***coronavirus, deep learning, machine learning, medical informatics, computing, SARS virus, COVID-19, artificial intelligence, review***

COVID-19 SPREAD CAN BE EASILY UNDERSTANDED AND TRACKED WITH AI

After the first incidence of coronavirus was discovered in China on December 31st, 2019, a Canadian AI business named BlueDot developed an AI algorithm that notified the globe to the virus. This tool was created to anticipate the spread of infectious diseases, as well as to find and track them. It works by integrating AI with epidemiologists' expertise of how to seek for evidence of new diseases and where to look for it. BlueDot analyzes approximately 100,000 records every day in a variety of languages and sends out regular notifications to clients in health care, government, industry, and public health. The warnings give a quick rundown of unusual disease outbreaks found by its AI algorithm, as well as the threats they may bring.

After the city of Wuhan, China, was quarantined to contain the virus, contact-tracing smartphone apps were swiftly sent out. To track and indicate probable infection carriers, AI has been integrated with other technologies. They also used AI to detect persons with fever in huge crowds using smart glasses driven by AI. Security personnel wear them, and they can check hundreds of people in a matter of minutes without making touch. In China, a variation of this type of monitoring system was employed in bus and train terminals, as well as other public places with a large population density. They achieved this by merging artificial intelligence (AI) with novel temperature measurement technologies based on computer vision. This method allowed for the contactless measurement of body temperature, a primary symptom of COVID-19, without disturbing people's usual activities. Those whose body temperatures surpassed the threshold may be promptly identified with this technology. Manual

temperature measurement is time-consuming and increases the danger of cross-infection due to the need to interact with people.

AI ASSISTS IN IMAGE SCAN ANALYSIS AND REDUCES THE WORKLOAD ON HOSPITAL STAFF

In the fight against COVID-19, testing has become a major issue. Because of the extensive testing conducted in those countries, countries such as South Korea and Germany have been deemed successful in combating the virus. As a result, health officials are eager to increase the number of people who are tested, but the most common testing procedures are labor-intensive and time-consuming. However, AI is increasingly being used to help with other types of testing, such as x-ray scanning. Several AI systems for chest screening are now available that can detect lung abnormalities in a chest X-ray scan and deliver a COVID-19 risk assessment considerably faster than human radiologists.

THE CONTACT BETWEEN HUMANS IS BEING MINIMIZED BY AI-DRIVEN ROBOTS.

In recent months, several AI-based robots have emerged to aid in the COVID-19 fight by reducing patient-to-health-care worker contact and thus reducing the risk of cross-infection.

To reduce the risk of cross-infection, Chinese companies are deploying drones and robots to make contactless deliveries and spray disinfectants in public locations. Other robots are checking for fevers and other COVID-19 signs, as well as dispensing hand sanitizer foam and gel. To reduce touch with human employees, robots are also utilized to give meals and medicine to patients, as well as disinfect rooms.

There are numerous additional examples in various parts of the world. There are numerous additional examples in various parts of the world. In hospitals around the United States, robot dogs are assisting doctors with medical assessments. Spot, a robot dog created by Boston Dynamics, is the first of its kind. This robot is being used to lessen the amount of time that health staff must encounter potentially infectious patients.

ARGUMENT TO THE USE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

For many years, AI has been employed in healthcare systems for a variety of purposes and has met with considerable resistance, particularly when it comes to the usage of medical patient data. Having access to medical records creates a slew of privacy and confidentiality concerns. When the British NHS system failed to comply with data privacy standards in 2017 when it provided 1.6 million patient records to a Google-owned company for machine learning analysis, it became a contentious issue. Nonetheless, because the epidemic has spread so quickly, contact-tracing apps are now being hailed as a critical tool in the fight against the infection.

CONTACT TRACING APPS

Contact-tracing apps are already widely used in Asia, in nations such as China, Hong Kong, Singapore, and South Korea; however, they are also being utilized in other regions of the world, including India, Italy, and Israel, and development in other nation states is ongoing. They work in a variety of ways, but they all rely on the fact that smartphone users' whereabouts can be tracked, allowing them to detect proximity to other users. The risk of cross infection may then be determined using AI algorithms, and users can be warned about it. For example, the British government is testing an app that uses the Bluetooth protocol to identify other smartphone owners that are near one another. As a result, a person who is not affected but is near someone who has COVID-19 symptoms could be notified.

Concerns have been expressed concerning the usage of contact-tracing apps, especially in terms of privacy and the likelihood of government surveillance of individuals – i.e., the menace of the "Big Brother" State. "There is a simple approach that people may aid the fight against coronavirus, beyond washing their hands," says Dirk Brockmann, an epidemiologist at the Robert Koch Institute in Germany who leads a coronavirus-fighting effort. Most people now have cellphones, and if they can be convinced that willingly contributing their data will help eradicate the virus and that the data will be used anonymously, they may be persuaded to do so. This is critical because, according to the Big Data Institute at the University of Oxford, "a contact-tracing app may help stop this pandemic, but 80 percent of smartphone owners would have to utilize it." This goal sets the bar extremely high for any type of persuasion.

AREAS FOR FUTURE WORK

There are several other areas in which AI has shown significant promise.

1. **Surveillance**

To assess if people are wearing surgical masks, infrared thermal cameras meant to screen the public for fever have been combined with AI-powered facial recognition systems. A computer vision startup headquartered in the United States has begun to sell software that uses camera images to monitor compliance with social distance norms. With the rise of such technologies, it's becoming clear that AI-based surveillance can considerably aid public health actions aimed at reducing infectious spread.

Blockchain technology is a digital approach that can be utilized in conjunction with AI to create a verified permanent ledger system for storing health-care-related data. For COVID-19 surveillance, a combination of AI and blockchain has been proposed for self-testing and tracking systems. Not only can a self-testing system overcome supply chain constraints in resource-poor nations to increase testing rates, but it can also provide real-time feedback on population health and allow for risk categorization of suspect cases.

AI may also be able to detect illness outbreaks ahead of time, giving health officials more time to respond. The usefulness of employing internet relative search volume (RSV) indices for anticipating COVID-19 outbreaks in different geographical locations has been established by Effenberger et al. The high in public attention, and thus the peak in RSV indicators, came before the peak in case counts. This means that trending RSV indices can aid public health officials in predicting and responding to local COVID-19 outbreaks.

2. **Big Data and AI**

Machine learning and other AI-based approaches can be used to take data from many sources and process it, resulting in new insights. We've talked about how AI's ability to quickly evaluate massive volumes of data allows us to utilize it to predict new outbreaks, model successful disease containment tactics, and determine the most effective treatment procedures [9]. Other areas of applicability, on the other hand, are yet to be explored.

Sun et al demonstrated the effectiveness of a Chinese health-care-oriented social network that streamed reports from local or national health authorities—along with data from several other worldwide media outlets—for epidemiological studies of the disease; AI can help with this collection.

When AI is used with big data, new medications to treat COVID-19 can be discovered. Deep generative models, for example, are integrated AI-based drug discovery tools for novel pharmacological compounds that may employ enormous data sets to train and develop new medications with optimum chemical attributes. These methods are frequently faster than typical computing methods.

Furthermore, AI combined with big data can be used to analyze the accuracy of publicly available web content. Stratifyd, a data analytics company based in the United States, examines social media posts, compares them to data from official sources, and notifies users when erroneous information is discovered. It can thus be used to combat the present pandemic by preventing the distribution of false information about the disease on the internet. AI can also be used to analyze data from foreign flights. AI can follow disease spread between nations in this way, allowing for assessments of importation risk and a location's capacity to respond, estimation of disease spread from the outbreak's epicenter, and identification of locations with undiagnosed cases imported from other countries.

3. **Other Core Clinical Services Operation**

Because the COVID-19 epidemic is putting a strain on health-care resources, hospitals have had to cut back on clinical services. For example, the American College of Surgeons has published guidelines for the management of non-emergency surgeries, advising hospitals to "carefully assess all scheduled elective procedures". Non-urgent medical appointments have been rescheduled in Singapore, and staff has been redeployed to help handle COVID-19 patients. AI can be used to supplement non–COVID-19 patients' care to lessen the impact.

4. **Clinical Management of COVID-19 Patients**

AI has previously been shown in studies to aid in the management of COVID-19 patients in general practice. With COVID-19, AI may be able to assist in the management of critically ill patients. Given the uncertainty surrounding the appropriate care of COVID-19–related acute respiratory distress syndrome (ARDS) [68], AI methods such as reinforcement learning could be utilized to select management options in order to attain the best clinical outcomes feasible [69]. Machine learning algorithms can be utilized to produce COVID-19 vaccines in addition to treatments. They've already been used on the proteomes of SARS-CoV-2 and nonstructural proteins.

CONCLUSIONS

In the world of medicine, artificial intelligence (AI) is not a new concept, and numerous studies have investigated how it may be used to improve patient care. Even as the situation in some countries improves, others continue to struggle to contain the spread of COVID-19. The application of AI-driven tools to aid in diagnosis, surveillance, discovering medicines, and

public health decision-making may help increase the efficiency and effectiveness of human efforts to combat the pandemic in the face of mounting pressure on limited health-care resources. Another study found that AI could help prevent and control the spread of COVID-19 by detecting suspected cases, large-scale screening, monitoring, determining interactions with experimental therapies, pneumonia screening, using the Internet of Intelligent Things for data and information gathering and integration, allocating resources; making predictions, models, and simulations; and using robotics for detecting suspected cases. In the later stages of the continuing epidemic, we expect that our rapid analysis will assist to identify other areas for more strong AI applications and investigations.

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